

**B.Tech Odd Semester (CBCS) Exam.,  
December—2016**

**INFORMATION TECHNOLOGY**

**( 7th Semester )**

Course No. : IT-704 E

**( Distributed Database )**

Full Marks : 75  
Pass Marks : 30

Time : 3 hours

- Note :
1. Attempt **one** question from each Unit.
  2. Begin each answer in a new page.
  3. Answer parts of a question at a place.
  4. Assume reasonable data wherever required.
  5. The figures in the right margin indicate full marks for the questions.

UNIT—I

1. (a) Define distributed database. Explain the characteristics of data delivery alternatives for distributed databases. 1+6=7

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( Turn Over )

- (b) What are the factors that classify distributed databases? State how homogeneous distributed database is different from heterogeneous distributed database. 3+5=8

2. (a) Explain the dimensions for defining the architectural models of a distributed database. 6

- (b) Explain in detail the peer-to-peer architectural model of a distributed database. 9

UNIT—II

3. (a) What are the orthogonal dimensions which investigate the organization of a distributed database? With a schematic diagram, explain the top-down approach of a distributed database design. 3+4=7

- (b) Explain in detail the concept of primary horizontal fragmentation. Also state how the correctness of primary horizontal fragmentation is checked. 5+3=8

4. (a) What are the issues that need to be considered in a distributed database design? 7

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( Continued )

( 3 )

(b) Consider a PROJECT schema with the following attributes, PNO, PNAME, BUDGET AND LOC. Let the queries raised from the schema be :

$q_1$  Find the budget of the project having identification no 102.

$q_2$  Find the name and budget of all projects.

$q_3$  Calculate the total budget of all the projects having identification number greater than 104.

$q_4$  Find the projects located in Bengaluru.

With the given access values, find the affinity between  $A_1$  and  $A_3$  attributes of the PROJECT schema under vertical fragmentation with number of accesses 3. 8

$acc_1(q_1)$	15	$acc_2(q_1)$	20	$acc_3(q_1)$	10
$acc_1(q_2)$	5	$acc_2(q_2)$	0	$acc_3(q_2)$	0
$acc_1(q_3)$	25	$acc_2(q_3)$	25	$acc_3(q_3)$	25
$acc_1(q_4)$	3	$acc_2(q_4)$	0	$acc_3(q_4)$	0

UNIT—III

5. (a) What are the properties of a transaction? Explain the model of a distributed transaction. 3+4=7

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( Turn Over )

( 4 )

(b) Explain the 2PL protocol for concurrency control in distributed database. Draw the graphs for 2PL and strictly 2PL protocols. 6+2=8

6. Why is concurrency control required for distributed database? Explain with an example. Explain in detail the time stamp based concurrency control protocol for distributed database. 7+8=15

UNIT—IV

7. Explain how deadlocks are handled in distributed database systems. 15
8. Explain in detail the two-phase commit (2PC) protocol. How is 3-phase commit (3PC) protocol different from 2PC? 10+5=15

UNIT—V

9. (a) With a schematic diagram, explain the layers of query processing in a distributed database system. 7
- (b) Write short notes on nested loop joins and hash joins. 4+4=8

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( Continued )

10. (a) What is query optimization? Consider the following query :  $2+4=6$

```
SELECT Name
FROM Customer CU, CheckedOut CH, Film F
WHERE title = "TRANSFORMER" AND F.
FilmID = CH.FilmID
AND CU. CustomerID = CH.CustomerID AND
CU.Street = "Elm"
```

Draw the initial query and also show how it can be optimized to the best form.

- (b) State the transformation rules of selection. Write the steps of 'Transformation Algorithm'.  $4+5=9$

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